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Checkerboard composites with separated phases

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Abstract

Recently the authors have developed a method [SIAM J. Appl. Math. 61, 1839-1556 (2001)] capable of solving, in closed form, boundary value problems for four-phase doubly periodic checkerboard composites with continuity between the different phases. The method is based upon a novel conformal mapping that preserves the doubly periodic nature of the physical problem. The aim of the current article is to explore generalizations of that approach where we now replace continuity between some phases by nonconducting or perfectly conducting strips, thereby modeling debonding or electrodes in electrochemical devices. The specific objective is to determine effective resistivities and related parameters for these four-phase objects in a concise and explicit form. © 2001 American Institute of Physics.

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